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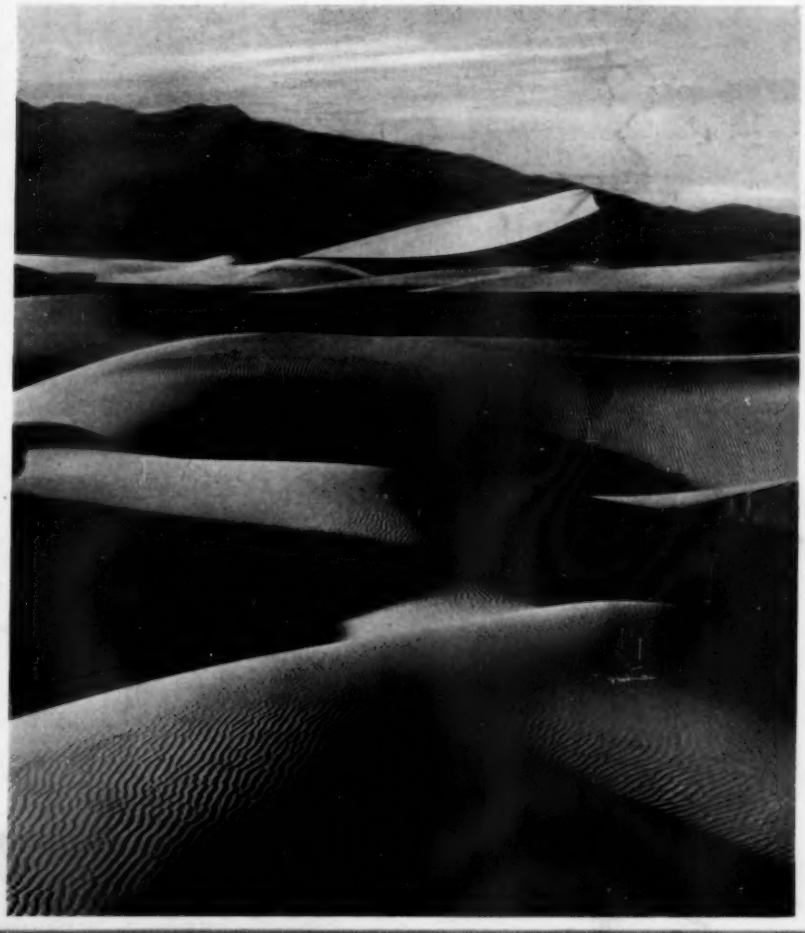
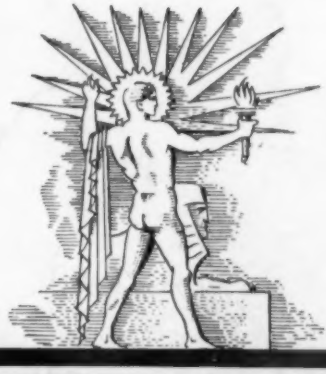
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





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Sand Patterns

See Page 275

A SCIENCE SERVICE PUBLICATION

Do You Know?

Queensland, Australia, now has 94 national parks.

The crossbow was used by Chinese soldiers several centuries before the Romans tried it.

On hard-surfaced roads the wear on rear tires of an automobile is found to be twice that on front tires.

Our idea of ancient Romans as stern and strong-faced men may come from the fact that so many Roman portraits were death masks.

A British woman scientist has been experimenting with properties of solid carbon dioxide, because an ice cream vendor called to her attention that his bicycle bell mysteriously rang when touched by this chemical.

Paint manufacturers say: After tightly closing a can of paint which you do not expect to use again soon, shake the can thoroughly several times during the first 24 hours, so that the paint will absorb the oxygen and no thick skin will form on the paint surface.

Don't laugh at foolish medicines of the ancients—a study of American Medical Association reports on some modern advertised preparations shows: 32 useless nose and throat preparations, 22 useless remedies for stomach disorders and indigestion, 11 useless hay fever remedies, 18 useless remedies for skin disorders.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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What new evidence indicates that Peking Man was a cannibal? p. 267.

ARCHAEOLOGY

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Must America get her potash from foreign nations? p. 266.

MEDICINE

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PSYCHOLOGY

Are parents often right in opposing marriages? p. 270.

What type of experts feel most sure that they can foretell future social events? p. 273.

Grooves made by cartwheels in ancient Britain show that the prehistoric carts were of about the same width as modern ones.

A fashion show of real Indian costumes was recently given by five Indian girls, employes in the Office of Indian Affairs, who explained how Indian styles varied.

Chemists call the pine tree an ideal chemical crop, in that it utilizes sunlight, water, and air without taking more than traces of nitrogen, potash, and phosphorus from the soil.

Thousands of dogs in Navajo Indian country, in the Southwest, help herd sheep.

The mummy of Akhnaton, Egypt's idealistic reformer Pharaoh, has never been found.

Land planted to corn and cotton tends to erode 100 times as fast as land planted to grass and other crops.

Armenia's most ancient known town, Dvin, which was wrecked by an earthquake in 893, is now being probed for buried ruins.

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ANTHROPOLOGY

Starvation Causes Abnormal Development in Young Rats

Lesson of Effects of War Can be Learned From Experiments Reported at Anthropologists' Meeting

WAR BRINGS famine, and the starvation has always been supposed to put a permanent blight on the children of the wartime generation.

Experimental check-up on this widely held sociological doctrine is obviously desirable—and just as obviously impossible to obtain with human subjects. But application can be made of experiments on deliberately short-rationed rats; and that is what was reported at the Pittsburgh meeting of the American Association of Physical Anthropologists by Prof. C. M. Jackson of the University of Minnesota.

Prof. Jackson took newborn rats and fed them just enough to keep them alive but not enough to gain any weight. He did the same thing with partly grown young rats. After these periods of controlled malnutrition he put them on full rations.

Dystrophic Changes

"When rats are held at birth weight for about two weeks," he stated, "the body undergoes marked dystrophic changes in external form, with enlarged head and eyeballs, elongated trunk and tail. The hair coat develops. The skeleton increases in size, with progressive ossification. Brain development similarly continues. In general, the enlarged organs (integument, eyeballs, testis, kidney) show also distinct tendency to normal differentiations of tissues. Normal development may proceed also in organs with decreasing weight (suprarenals), although regressive changes occur in the spleen.

"In older growing rats held at constant body weight for longer periods, the changes in organ weights are different," Prof. Jackson continued. "In the more fully developed tissues, degenerative changes occur. The surviving undernourished rats show remarkable capacity for recovery on normal refeeding, although permanent stunting is possible.

"In male rats fully refed after stationary body weight from 3 to 18 weeks of age, there is an initial spurt of abnormally rapid growth. This rate soon decreases, however, and the test rats ultimately lag about 16 per cent. behind the controls in average body weight.

"The original disproportions in the dystrophic rat become corrected, so that the various organs in general tend to recover the size normal for corresponding body weight. In some cases, however, organs may remain permanently undersized or oversized."

No Physical Types

Students in American universities are nonconformists when it comes to matching themselves up to preconceived "standard" physical types. Drs. William H. Sheldon and William B. Tucker of Chicago, who have measured sizes and shapes of 2,500 co-eds and 4,000 men at four leading Midwestern institutions, reported their findings on this revolt of youth against bodily regimentation.

Three widely accepted physical types are classified as round or pyknic, square or athletic, and slim or leptosomic. Each type is supposed to have certain mental traits corresponding to the physical shape.

As a matter of fact, the two Chicago physicians found not three types but an almost infinite number of them—"a continuous trivariate distribution . . . There were not types but a continuous distribution of three components in human morphology." And the mental traits, so far as they could be measured at all, were just as much of a defiance to rigid assortment into classes.

Ancient Melting Pots

Racial melting-pots are no new thing under the sun. Racial successions quite as complex as those now going on in modern America occurred in Asia Minor in the gray dawn of history. Their main outlines, as traced by skulls and bones collected in Syria, Anatolia, and Iran (Persia), were reported by Prof. W. M. Krogman of Western Reserve University.

Prof. Krogman found in the collections he studied skulls typical of Nordic, Mediterranean, Alpine, and Armenoid races, with Negro and Asiatic also represented. Basic, earliest at all sites, was the long-skulled Mediterranean type. Throughout the area it dominated levels dated earlier than 3000 B. C. In some of the skulls there were negroid traces.

Nordics appeared on the scene as early as 3000 B. C. in the country around the Aral and Caspian seas, but did not become a real factor in Asia Minor itself until five hundred or a thousand years later. The round-headed Alpines arrived in force about 2500 B. C. Armenoid roundheads show up about 1500 B. C. at the earliest, and cannot be called really distinct until about 1000 to 500 B. C.

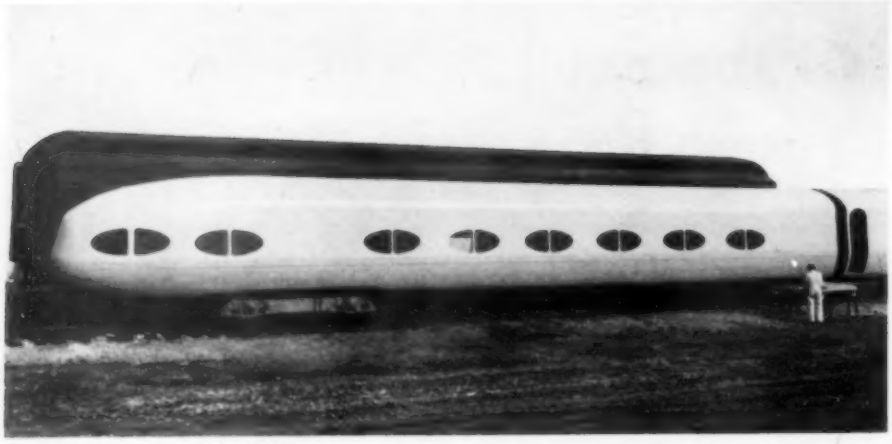
The Negro and Asiatic skulls, said Prof. Krogman, were found at one site dated between 2500 and 2000 B. C. They were apparently strays, however, and as types play no real part in the photohistory of Asia Minor.

Science News Letter, April 23, 1938

Despite poetic allusions to the stag drinking his fill, a British naturalist says he has never seen a deer drinking or found any one else who has.

PERSONAL RECORD

We often hear of "electric personalities", but it is not often that an automatic photographic record of one can be obtained. Miss Francis M. Davis, X-ray artist of Santa Monica, Calif., explains this one: "One day when I was full of static and in a hurry, I touched this film in the dark and this pattern developed where sparks had jumped from my fingers."



TOMORROW'S RAILROAD COACH

It may be coming to life in the form of this "pendulum" car now being developed by three California Institute of Technology scientists near Los Angeles. It hangs by soft springs from towers mounted on the trucks instead of resting on short, stiff springs over the trucks; it saves weight by applying aviation's "monocoque" construction which uses the skin to support the structure, thus eliminating girders and saving weight. Notice how low it appears compared to the conventional car behind it; but it is no less roomy.

ENGINEERING

New Type Railroad Coach May Revolutionize Travel

Borrowed From Disused Monorail Car, "Pendulum" Suspension From Above Brings Comfort to Travelers

By DR. R. M. LANGER

A RADICALLY new type of railway car that may revolutionize American train-riding habits and may recover much of the passenger traffic lost by the railroads in recent years to the bus and automobile is under test near Los Angeles.

Differing markedly from conventional cars not only in appearance but in fundamentals of construction as well, the new "pendulum" type car is hung like a hammock from above instead of riding on short springs over the trucks and under the floor of the car.

Swinging easily from the long soft springs by which it is suspended, the cars give passengers a ride which, for smoothness, cannot be compared with present-day passenger equipment.

Built for the Atchison, Topeka and Santa Fe Railway, the car is a practical and novel compromise with the frequently-tested, but never widely applied, principles of the monorail car.

When going around a curve, the floor swings out farther than the ceiling like a monorail and opposite to the ordinary cars of today. If a passenger happens to be drinking a glass of water on a curve the motion of the car is such as to help him balance instead of tending to spill the drink into his neighbor's lap.

While the riding advantages of the monorail overhead track suspension are obtained, the car runs on ordinary rails, eliminating one of the most important objections to the introduction of the monorail.

A four-wheeled truck is built up with two towers reaching about halfway between the floor and ceiling. Four flexible springs are carried on top of the towers, from which the car is suspended. Two such trucks carry each car. The springs are contained in closed compartments which take up only a small fraction of the useful space in the car. Lateral and longtitudinal motions are united and cushioned.

Since the springs are not crowded into the limited space, they need not be nearly so stiff as in present trucks so that riding qualities are superior and a trip is smoother as well as better balanced. It is easier to write or to walk and there is less jarring on the new cars than on standard coaches attached to the same locomotive and passing over the same track.

Railroad Family

The new development is due to three young men, Cortlandt T. Hill, William E. Van Dorn and F. C. Lindvall, who designed and built the trucks and passenger coaches tested by the Sante Fe. Hill is the son of the retired chairman of the board of directors of the Great Northern Railroad and grandson of James J. Hill, the "Empire Builder." Van Dorn, who originated the project while studying at the California Institute of Technology, comes from a railroad equipment family. Lindvall is professor of electrical engineering at the California Institute of Technology and a graduate of the Railway School of the University of Illinois.

The new coach appears much lower than the standard passenger car, yet it is as roomy as the older model. The floor level is low, giving great stability and convenience.

Differing not only in the way it is mounted, the car represents a combination of construction principles used in other transportation fields.

There are no supporting beams in the new coach. The strength is contributed entirely by the shell of the car itself. This is the socalled stressed-skin or monocoque type of construction which has been developed so successfully in the airplane industry.

Double Use

The weight of the strength members in present passenger coaches is the major load and the double use of the shell or skin for structural as well as for closure purposes is an important weight saving. The new construction is more rigid than than the old and as resistant to collapse in accident. The stressed skin construction naturally leads to rounded corners, smoother stream-lined bodies and graceful elliptical windows. Full air-conditioning will be provided.

In test runs up to 94 miles an hour riding records show a superiority of the "pendulum" car over standard, and standard lightweight, equipment in the same train.

During the tests engineers rushed from the standard cars to the new ones, carrying gadgets designed to measure the jerks due to curves and the inevitable irregularities of the track. Others sat by groups of blocks like children's building

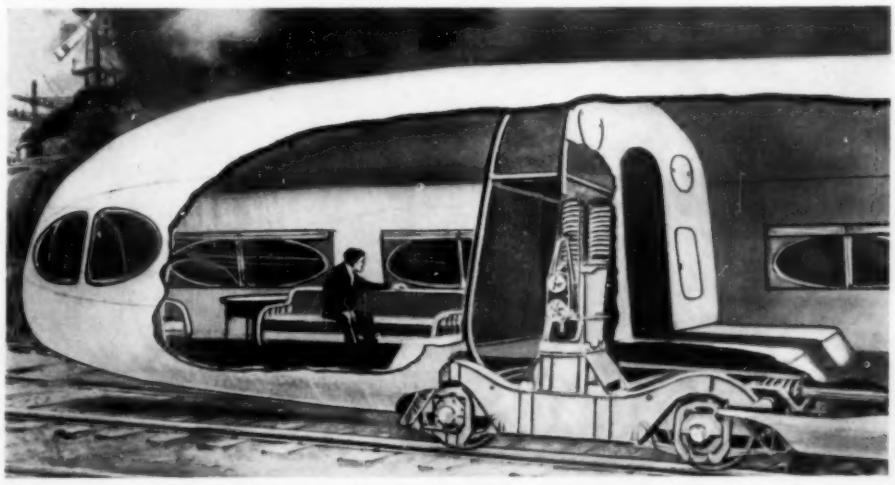
blocks and watched them topple as the cars lurched. Some sat at tables and tried to write, to compare the ease of writing in different cars. Some wandered through the corridors to see how hard it is to keep their balance. Others just looked at the landscape "to feel" the ride.

As important as the comfort of the passengers, is the cost of operation and maintenance of the new car. This is determined, in large measure, by the lightness which can be achieved without loss of safety. In this respect the "pendulum" car is noteworthy.

The "pendulum" car weighs 60,000 pounds as compared with about 160,000 pounds for the standard coach of today. The lightness makes possible faster stopping and starting. The good road-holding and smooth-riding qualities mean that there is no sacrifice of passenger comfort or long life of equipment. Diminished fuel and motive power requirements for light trains constitute an additional saving of weight. Braking becomes easier and the wear on wheels and tracks and roadbed is cut down.

The pendulum action and low center of gravity allow higher speed on curves. The linkage between the body and trucks is so flexible that the train could go around a curve of 180-foot radius. These considerations are especially important on short, tortuous runs through suburban areas where commuters watch every minute of schedule time.

Science News Letter, April 23, 1938



SUSPENSION

Soft springs on these towers carry the "pendulum" car which is suspended from them. Result of the novel construction, details of which are shown in this artist's drawing, is an easy-riding car that takes curves so well water will not spill out of the passenger's drinking cup. The principle of overhead suspension is adapted from monorail cars, which were never widely used because of already-existing two-rail track facilities; the new car rides on the regular tracks.

CHEMISTRY

Make Your Own Diamonds of Iron Filings and Sugar Carbon

Graduate Students Can Produce Genuine Stones, But Have Trouble in Finding Them After They Are Done

REAL diamonds made in the chemical laboratory, synthetically, were described at the meeting of the American Chemical Society in Dallas, Texas.

How many imminent bridegrooms for this year's crop of June brides thus missed an opportunity to go into the diamond-making business at the right time is unknown, but for their benefit the details should be recorded as outlined by Lewellyn D. Lloyd of the chemistry department of McPherson College, McPherson, Kansas.

Under the direction of Dr. J. Willard Hershey at McPherson synthetic diamonds have been prepared by successive groups of graduate students. Here is the simple formula for making diamonds:

Mix two parts of chemically pure iron filings with one part of pure sugar carbon, by volume. Place in a graphite crucible and heat to a temperature of at least 4,000 degrees Centigrade for a little over an hour. Then remove the crucible and plunge into a freezing solution of ice and salt brine. Treat the hardened mass with hot aqua regia for 300 hours to dissolve the iron and digest the residue as much as possible with various acids. Finally search the remaining carbon dust for the diamonds. Use a microscope in the search, for any diamonds will be very tiny. But they will be diamonds, which is what you started out to make.

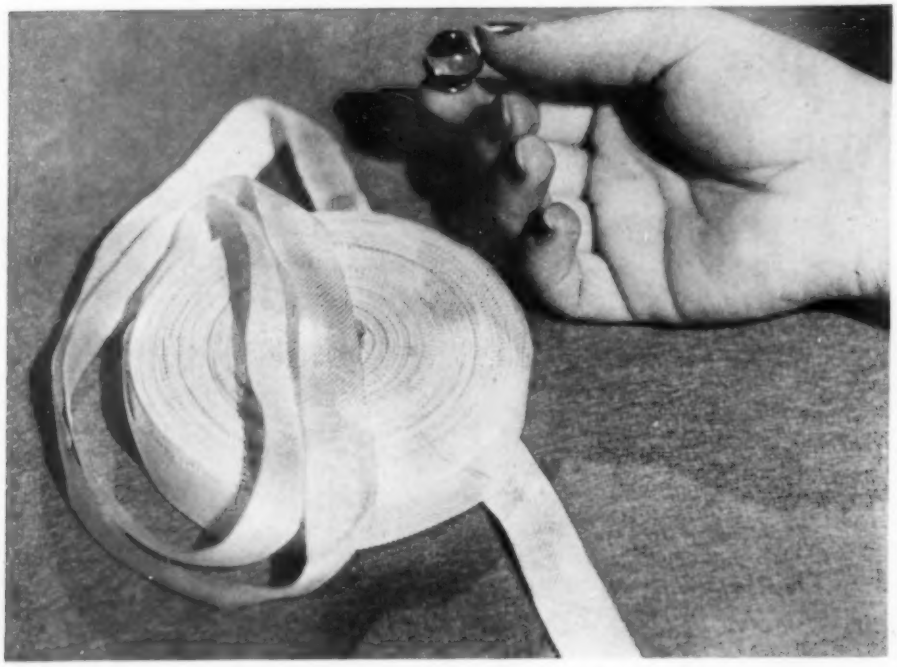
But seriously, the simple statements above have required a great amount of research to bring them about. When Dr. Hershey began the year there was no way in which temperatures of 4,000 degrees could be controlled in a fashion required in the research. And there was the problem of building a fire brick furnace that could withstand the high temperatures.

The continued research has shown, Mr. Lloyd indicated, that the formation of the diamond seems to depend on how fast is the cooling of the heated mass of iron and carbon. This cooling and the tremendous pressures which are built up inside the iron-carbon mass during cooling, seem to turn black carbon into the transparent carbon which man calls a diamond.

As white hot molten iron cools to a red solid it expands, Mr. Lloyd said. As it cools from a red solid to room temperature it contracts. Thus the outside of the iron, which cools more rapidly than the inside of the mass, is contracting while the inside is still expanding. The carbon, dissolved in the iron, is thus subjected to a pressure estimated at 180,000 pounds to the square inch.

Dull Treasure Hunt

One of the most tedious stages, Mr. Lloyd said, is the searching for the microscopically-small diamonds after they are made. A student has recently proposed a method of mixing the final residue with potassium bisulphate which has a specific gravity between that of graphite and diamonds. Thus, the diamonds, if there are any, should sink to the bottom and the graphite float to the top. After the mass hardens it should



GLASS LACE

To insulate the coils of powerful electric motors, glass marbles, three-quarters of an inch in diameter are used to draw strands much finer than human blonde hair. The thread thus formed is made into gauze-like tape, fireproof and moisture proof, which is being used experimentally by Westinghouse engineers.

only be necessary to examine the bottom portion of the mass to get the diamonds.

Body Pierced by Atoms

The work of scientists smashing atoms with giant disintegrating machines, or studying atoms blowing themselves apart in radioactive processes, may seem remote from everyday living, but the truth is, that man himself is just a walking sample of disintegrating atoms. Every minute over 500,000 atoms—yes, your own atoms too—are tearing themselves apart. And at each disintegration, wherever it may occur in the body, rays are sent out which pierce the tissues for a distance of about a fifth of an inch.

Before the meeting of the American Chemical Society, Dr. A. Keith Brewer of the U. S. Bureau of Chemistry and Soils, Washington, D. C., told of the amazing and vastly important role which the element potassium plays in living and in inanimate nature.

One variety of potassium, known as K_{40}, is the culprit which is disintegrating within the body at the rate of 600,000 atoms a minute for a man weighing 160 pounds. Of all the chemical elements necessary to sustain life potassium is the only one which is radioactive.

Some investigators, explained Dr. Brewer, hold that potassium's radioactivity is the cause of the heart beat and that it has a basic role in the germination of seeds. And because it liberates piercing radiation there is a suspicion that it has played a part in causing these freak offshoots in man's natural evolution. Radiation from X-ray tubes and tubes from radium, very similar in nature, have been shown to produce mutations, as these freaks are called.

May Cause Mutations

Thinking biologists, since the discovery of piercing cosmic radiation, have asked whether such rays might cause mutations also. Dr. Brewer has no answer to that question but he has evidence indicating that one needs to look no farther away than one's body to see a greater, possible cause of mutations. Radioactive potassium, he has found, has a 75-to-one better chance of causing a mutation than does a cosmic ray.

Back 250,000,000 years in the carboniferous geologic age, when coal was in the making, there was much more potassium. In that long past epoch of geological time, estimates Dr. Brewer, potassium had a 375-to-one chance over cosmic rays.

In disintegrating, potassium 40 can create either of two elements, calcium or argon. K_{40}, says Dr. Brewer, is the "parent" of over 99 per cent. of all the calcium in the world today. Thus man's teeth and his bones, and those of other animals, owe this debt to the disintegrating potassium element. In fact, from the known abundance of calcium—in various forms—in the earth's crust, it is not very much wrong to say that much of the world and much of the animal life on it sprang from exploding potassium atoms.

Geologic Puzzle

The passage of potassium into a form of argon, Dr. Brewer states, explains a long-baffling puzzle of geologists; the presence of argon gas deep within the earth. Argon, an inert, colorless gas, is one of the constituents of the earth's atmosphere. Disintegrating potassium accounts, according to Dr. Brewer's estimates, for over 95 per cent. of all the argon over or in the earth.

Atoms of potassium, breaking up, form a most important means of checking the age of matter, Dr. Brewer points out. In fact, of all the known elements, radioactive potassium is the most important in determining the geological age of the earth.

Other radioactive "time clock" methods, he explains, deal with determinations of the amount of helium in rocks, the ratio of uranium to lead and so on. But all these methods give only a measure of the time which has elapsed since the earth's crust solidified and the minerals — as we know them today — were formed. Such estimates give the age of the earth's crust as something like 5,000,000,000 (five billion) years.

The methods using disintegrating potassium as a "time clock," do not suffer from this limitation. Dr. Brewer is able to estimate that it has taken 15,000,000,000 (15 billion) years for potassium to produce the amount of calcium in the world. Thus the age of matter is at least this long, and, naturally, considerably greater than estimates based on the age of the earth's solid crust.

Whether 15,000,000,000 years goes back to a time when the earth was part of the sun, Dr. Brewer has no way of knowing, of course.

America's Potash

America is now free of dependence on foreign countries for its supply of potash, valuable chemical widely used by the nation's farmers as an ingredient in fertilizers.

How a dry lake (*Turn to Page 274*)

MEDICINE

When Putting Drops in Nose Turn Your Head Upside Down

Method of Application Developed for Prevention of Infantile Paralysis Called Useful in General

HERE'S how to put drops in your nose. It's simple, safe and accurate.

All you do is turn your head completely upside down and let the solution trickle until it forms a great lake. The great lake forms in the olfactory area and immerses the membranes.

The upside down method is the favorite technic of four physicians at Stanford University School of Medicine. After a study of various means of putting drops in the nose, they have adopted this method for applying zinc sulfate to the noses of children in an effort to ward off poliomyelitis.

Any solution, however, may be placed in the nose in this fashion. It will be better tolerated if previously warmed to body heat in a water bath, the Stanford men say.

In the *Journal of the American Medical Association* (April 16) Drs. Lee Shahinian, J. A. Bacher, R. C. McNaught and R. R. Newell of San Francisco present this technic. They favor it over the atomizer and various postural methods of applying chemical agents to the olfactory mucosa.

They place the child or adult on a table and let his head hang over the edge until it is completely inverted. The base line of the skull is horizontal.

Then with an ordinary medicine dropper they introduce the fluid slowly and steadily drop by drop.

One minute after the last drop has entered, they tell the patient to turn over in a prone position, lift his head and sniff outward. This procedure prevents unpleasant effects in the throat resulting from swallowing the solution.

Other methods of applying zinc sulfate are less efficient and more difficult, they hold.

The four physicians have worked out the approximate quantity of fluid necessary to immerse the membranes of children, youth and adults.

These are 0.5 cc. for children under 10 years; 0.4 cc. for those between 10 and 14, and 0.25 cc. for adults.

They stress the quantity of fluid to be introduced into the nose because the distress after treatment with chemical agents may thus be minimized.

In the same issue of the Journal of the American Medical Association, there is reported a case of anterior poliomyelitis in a man of 68. This is thought to be the oldest age at which anyone has died of this disease, which occurs most frequently in the young.

Science News Letter, April 23, 1938

MEDICINE

Control of Virus Diseases Predicted For Future

EVENTUAL control of virus-caused diseases, to which group both influenza and infantile paralysis belong, was predicted by Dr. Thomas M. Rivers, director of the Rockefeller Hospital, at a meeting at the New York Academy of Medicine.

"Adequate control measures have already been found for some virus maladies, e. g., smallpox and yellow fever," Dr. Rivers said, "and there is every reason to believe that preventive or curative methods will be found to combat others."

The viruses, most of which are invisible even under the most powerful microscopes, appear to be in the borderland between living and non-living matter. Recent studies of viruses have suggested that these "midgets of the microbial world" may be examples of spontaneous origin of infectious disease, about which scientists have argued for centuries.

"No one has yet established the de novo (spontaneous) origin of a single infectious disease," Dr. Rivers said, but he added that it would be foolish to deny the spontaneous origin of an infectious disease in the past or the possibility of such origin in the future.

Regardless of whether infectious diseases originate spontaneously and regardless of whether this is ever definitely proved or disproved, scientists will be able, Dr. Rivers believes, to find ways of controlling such diseases. He emphasized this by pointing out that the means of preventing smallpox, a virus-caused disease, was discovered centuries before its virus cause was known and even long before the relation of bacteria to disease was appreciated.

Science News Letter, April 23, 1938

ANTHROPOLOGY

Thighbones of Peking Man Give New Information

PEKING MAN now has a couple of legs to stand on. Whereas all previously reported fossils have been skulls, Prof. Franz Weidenreich of Peiping Union Medical College now announces the discovery of two fragmentary thighbones, which were found by his colleague Dr. W. C. Pei. (*Science*, April 8).

The thighbones are slighter in build than those of Neanderthal Man hitherto found in Europe and the Near East. However, Dr. Weidenreich is inclined to regard this as a sex difference, for the known Neanderthal thighbones belonged to males and the new Peking fossils appear to be those of women.

Comparison of the Peking Man thighbones with the thighbone found at Trinil, Java, forty years ago and believed to be that of Java Man, Pithecanthropus erectus, shows that the Peking bone differs from the Java fossil in exactly the same respects in which it differs from modern human thighbones. Prof. Weidenreich therefore concludes that the Java thighbone is not that of Java Man, but is modern—a point already suspected to be the case, on other grounds.

The shape of the new-found bones confirms Prof. Weidenreich's previously expressed opinion, that Peking Man walked upright. Traces of fire on them constitute further evidence for the already-stated belief that Peking Man was a cannibal.

Science News Letter, April 23, 1938

DENTISTRY

Lime Drop Candies Cause Tooth Decay

LIME drops, lemon drops and similar acidified hard candies can cause tooth decay, Drs. Edward S. West and Frederick R. Judy of the University of Oregon Medical School reported to the Federation of American Societies for Experimental Biology.

Hard candies are often acidified with citric acid, they pointed out. When these dissolve in the mouth the resulting acid solution causes erosion of the teeth and actually dissolves some of the tooth mineral.

The Oregon scientists described experiments in which they mounted teeth in rubber stoppers, with wax to protect the roots, and bottles fitted to the stoppers. The bottles contained solutions of candies in water and in saliva. After 24 hours a 40 per cent. solution of lime drops in saliva had dissolved 10 milligrams of tooth enamel mineral. While 10 milligrams is not a very large amount of material, loss of it from a tooth would seem enough to result in a cavity and a session at the dentist's.

Science News Letter, April 23, 1938

ARCHAEOLOGY

Art Error Gave World Strange Idea of Cherubs

SAY "cherub" to the average person and he thinks of wise-eyed infants with Cupid wings. He knows many a cherub like that in religious paintings—Raphael's Sistine Madonna, for example.

And yet, real cherubim in the Bible were never angelic babes. Making them so is an art error.

It seems that Renaissance artists, like other people of their day, had no idea what a Biblical cherub was. So, they borrowed winged Cupid from Greek and Roman art. And so lovely is the result that no archaeologist would want to substitute an authentic cherub for a Raphael one.

Nevertheless, archaeologists now and again try to remind the public that cherubs of ancient Bible lands were fantastic winged animals with human heads.

Thus, a new and non-technical archaeological journal, "The Biblical Archaeologist," starts its first number with latest views on the cherub question.

Prof. W. F. Albright of Johns Hopkins University, one of the editors, says that actual appearance of Old Testament cherubim — plural of cherub — was forgotten before the time of Christ.

Josephus in the first century A. D. wrote: "No one can tell what they were like."

But we can tell. Archaeologists have found in Assyrian ruins many stone bulls with wings and human faces. In Egypt are found sphynxes with lion body and human head, but wingless. Palestine, says Prof. Albright, favored a winged lion type.

Their use? In Assyria they guarded gateways, and a winged bull might weigh 40 tons. In the Bible, the Ark of the Covenant was guarded by upraised wings of golden cherubim. The thought of deity enthroned or riding on these mystic creatures was also familiar in Bible lands, and is mentioned in Old Testament books.

Cherubim symbolized virtues in living creatures — the eagle's swiftness, strength of the ox, the lion's kingly power, and the wisdom of man.

Science News Letter, April 23, 1938

METALLURGY

Inventors Add Soap For Stainless Silver

TWO British inventors added soap and other chemicals to a silver electroplating bath and found that the silver plating they produced, unlike that resulting from ordinary methods, needed no polishing to brighten it up, a patent granted to them reveals.

Considerable economies, through elimination of the labor of polishing and through saving precious silver that is rubbed off and lost in burnishing, result from the new process, Alan R. Powell and Emyr C. Davies of London declare in specifications filed with their patent, No. 2,113,517.

The addition of soap and chemicals such as carbon bisulphide, a compound used in many industries as a solvent, produces a plating which is hard and bright, they declare.

When a soap is used, they state in the patent specifications, the amount required depends on the nature of the soap, but should be sufficient to produce a permanent lather when the solution is shaken. Through a complex reaction of the soap and other chemicals present, the silver is deposited on the object being plated in the form of "almost submicroscopic crystals" with a fine-grained structure. The patent is assigned to an English firm, Johnson, Matthey and Company of London.

Science News Letter, April 23, 1938

IN SCIENC

MEDICINE

Cosmetic Cream May Affect Sex and Cause Cancer

BEWARE of Endocreme, a cosmetic with a menace.

The *Journal of the American Medical Association* has broadcast a warning against a widely advertised beauty product. (April 9)

Serious changes in the genital and reproductive organs of women; changes in the breasts; possible disorganization of the menstrual cycle; potentiality of the production of cancer—these are the fearsome possible consequences that indiscriminate use of Endocreme may bring, the medical journal states.

Endocreme is applied by many women to the face, neck, arms and hands every night. The purchaser is cautioned on the label against omitting treatment for a single night if the best results are to be obtained.

From many sources comes scientific evidence that serious harm may follow the persistent use of this product. It contains estradiol, a hormone.

About one-fifth of the amount of this ointment, which is applied nightly by many women, was rubbed daily on the back of the neck of spayed female rats, young normal male rats and normal male guinea-pigs for periods of from two to twenty-one days.

Prof. Carl R. Moore of the University of Chicago finds that this amount of Endocreme (1) induces an estrous reaction in castrated female rats in forty-eight hours; (2) maintains normal uterine weight in such rats; (3) induces growth of mammary glands in normal male guinea pigs, and (4) exerts profound degenerative changes in the testes of normal young rats.

Contrary to the manufacturer's claim, the substance may be absorbed from the skin and may thus exert systemic effects, says the medical journal.

Endocreme is manufactured by Hirestra Laboratories, Inc., New York; it bears the approval of the Good Housekeeping Bureau.

Science News Letter, April 23, 1938

NCE FIELDS

DOCUMENTATION

Machine for Reading Microfilm Is Patented

THE compact, portable reading machine for reading books and documents recorded on microfilm developed under the auspices of Science Service, the non-profit institution for the popularization of science, was patented last week.

Covering several basic features of the machine, Patent No. 2,113,578 was granted to Lt. Rupert H. Draeger, United States Navy surgeon.

The reading machine was developed as part of Science Service's sponsorship of the movement to spread use of microphotographic methods of document and book recording and reproduction, which resulted in the formation of the American Documentation Institute. In use in many libraries throughout the world, microfilm permits recording of an entire book, for example, on but a few frames of motion picture film. Its advantages are extreme compactness—an advantage much to be desired as library after library finds bulky periodical and book files piling up faster than space can be found for them.

The machine is essentially a projector which enlarges and throws on a translucent screen an image of the film. Slightly larger than an office typewriter and costing less, it enables rapid reading of the rolls of film. Pages are turned by a hand crank on existing models, although Lt. Draeger previously patented an automatic page selector.

Lt. Draeger also received Patent 2,113,580 on an adjustable film gate for the machine. Lt. Draeger's patents are being handled by the Chemical Foundation in the public interest.

Science News Letter, April 23, 1938

ARCHAEOLOGY

Digging Shows Why Rome Failed in Ancient Britain

ONCE again the past teaches a lesson in conquest and its results.

Archaeological investigation in England is revealing what written history has never explained: How and why Rome failed to Romanize barbarian Britain, 2000 years ago.

Rome failed, says Dr. R. E. M. Wheeler, London University archaeologist, because Rome tried in Britain to introduce too revolutionary an upheaval in a social order. (*See review*, p. 276)

Rome brought a pattern of city life which was new to the Britons because it centered around commerce. Excavations show that the Britons had their own cities. But the citified Briton was bucolic. He drew on the nearby countryside for food and for the stone, iron, clay, bone, and horn that made weapons and household gear. Rarely did these prehistoric Britons import foreign luxuries. Their trade was petty.

Came the Romans, and they set about improving these people. Native towns that resisted were stormed and dismantled, as has been recently shown by digging at Maiden Castle. Disarmed townsfolk remained to rebuild their houses and become Roman subjects.

The Romans introduced foreign craftsmen to teach the natives to build in the Roman way, and foreign capital to develop resources of the country.

By the middle of the second century, says Dr. Wheeler, London and Verulamium ""shone brightly on the provincial landscape." Britain had acquired central heating, dust-proof floors, bath suites.

But, "little more than a century later the bubble had burst." Another century, and Romano-British cities degenerated into concentrated slums. No prosperous middle class had developed, and without this type the Roman city plan was bound to fail.

Dr. Wheeler sums it up: Rome effected a political and social revolution in Britain, but not the economic revolution to fit it. Romano-British country life succeeded. The cities awaited the middle ages for a come-back.

Science News Letter, April 23, 1938

ENGINEERING

First Glass Cornerstone Is Laid For World Fair

THE cornerstone for the Egyptian pavilion of the New York World Fair, laid recently, is the first glass cornerstone to be laid in the history of the building construction industry, fair officials declared.

Laid in place amid a colorful setting, the glass cornerstone contains a copper chest in which are mementoes of the occasion. The chest is visible through the glass blocks.

Science News Letter, April 23, 1938

PHYSICS

May Spot Airplanes With Television Receivers

"ENTIRELY possible" is the scientific verdict of radio engineers at the National Bureau of Standards to British dispatches citing the use of television receivers as "spotters" of airplanes.

While Army officials would not confirm reports that similar methods are being worked out for the military uses of the United States, it was admitted that secret research is underway to test other ways of spotting airplanes than by the present sound detection methods.

Since television broadcasts have been in progress over London it has been noted that when airplanes are flying in the vicinity there are produced "ghost" images in the television receivers. These "ghosts" are caused by reflection of the television waves from the metal airplane surface. Thus the reflected waves arrive at the television receivers at a slightly different time than the ordinary waves. The result is a dual image of the scene being transmitted. The image of the plane itself is not received.

According to British reports the displacement of the "ghost" image has been correlated with the distance of the plane away from the television receivers. A system has been worked out whereby television receivers on England's eastern coast could thus serve as "spotters" for approaching enemy aircraft in time of war.

Whether the plan can be worked out in complete detail and serve a valuable military use is for the future to decide, but in principle the method is an almost exact counterpart of the system of determining airplane altitude by having the plane send down to the ground a beam of radio waves and then having the plane pick up the signals of the reflected waves. This method was announced by Dr. E. F. W. Alexanderson of the General Electric Company in 1928.

For the television case, in contrast, the waves go up, strike the plane, and are picked up by ground receivers. By multiple receivers and methods of triangulation it is believed the altitude of the plane and its approximate direction and distance could be worked out.

In another analogy the television spotting system for planes can be called "upside-down" geophysical prospecting. In geology, metallic masses are located by reflected radio waves.

Science News Letter, April 23, 1938

PSYCHOLOGY

Elopements May Succeed

Runaway Couples May Find Happiness Almost As Often As Those With Traditional Rites; Blackmail Fails

By MARJORIE VAN de WATER

"GIN Marriage" laws, preventing elopement and hasty weddings, are popular means of attempting to stem the tide of divorce and unhappy marriages in the United States.

Actually, drunks and thrill seekers are a small fraction of the numbers of those who wed in secret. Although this particular type of matrimonial escapade has a very small chance of leading to anything but disaster, elopements as a whole turn out rather well.

Where laws requiring a wait for marriage licenses are not in effect, elopements are very popular. In Elkton, Maryland, for example, the swift and convenient arrangement of marriages is the leading industry.

The runaway couple may drive up to any of a number of peaceful little old houses on a quiet, tree-lined village street where is visible the sign "Minister, Marriage License." Actually, the marriage license is not obtainable there, and perhaps not the minister either. Instead, there is a sort of master of ceremonies. For a sum of money, he makes all arrangements. The marriage license clerk is located and brought to his office, no matter what the hour of the day or night: Appointment with the minister is arranged; witnesses are provided if necessary. This accommodating person drives the couple on the needful trips about the town in his car and takes care of all fees in his capacity of a super-best man.

Wait Their Turn

At the minister's, the couple probably finds others before them, so that they must wait their turn, but the telephoning has helped. Soon they are shown into the parlor, the service is read quickly, the certificate ornamented with lilies-of-the-valley design is filled out, and they are ushered out man and wife as the next couple comes in.

It is possible also in Elkton to find a minister who tells you that he is "independent." He arranges his own weddings and does not charge the customary fee for this service. But marriages are only a sideline with him; he is an antique dealer who specializes in fragile old American glass.

Los Angeles County, California, home of the movie colony, is another place very familiar with elopements, and they also know unhappy marriages. There, Dr. Paul Popenoe, director of the Institute of Family Relations, has made a particular study of elopements—738 of them—taking place not only in California but in many parts of the United States. The Institute was founded to study what science can do to save human lives from emotional disaster.

Runaway and secret marriages are successful for 48 out of each hundred couples studied by Dr. Popenoe.

Does this look to you like a good showing or a bad one? Here is what Dr. Popenoe comments:

"If they were all in Los Angeles County the showing would be good enough, for more than half of all the marriages in this county end in the divorce court," he said. "But they are not even confined to California (where one marriage out of every three is terminated by divorce); they are to a large extent representative of conditions throughout the United States."

Educated

Since the eloping couples studied were all educated people known to students in Dr. Popenoe's college classes, he prefers to compare the figures with those for divorces among educated, white, Americans. These showed that 58 out of each hundred such marriages are happy. Yet this figure is not quite right, either, because these couples had been married for at least five years. In five years some unhappy ones had already disappeared from the group by early divorce.

"The true figure," Dr. Popenoe believes, "would be considerably less and might justify the conclusion that the record of happiness in elopements of this group is not more than ten per cent. lower than the average."

When you consider all the difficulties faced by these young people, this record is really not bad at all.

The kind of wedding ceremony cannot be blamed when the marriage turns out badly, Dr. Popenoe concludes.

All sorts of reasons lead to runaway marriages. It seemed to Dr. Popenoe that each couple had a new motive for preferring secret nuptials. Yet he was able to group them into five general brackets. First, there are still the classic elopements of the ladder-to-the-window type in which the objection of stern parents is the principal reason for the elopement. Publicity is another cause for runaway marriages. Couples elope either to avoid publicity or perhaps, as with some Hollywood matches, to seek it. Another contributing factor is economy; couples want to avoid the expense of a big wedding. In a few cases, the elopement is a parallel to the shotgun marriage; it is a "shotgun elopement." Finally, a miscellaneous grouping includes the "gin marriages" and those embarked on for a thrill; or impulsively, to spite some other person.

Parental Objection Blamed

Not quite half of all elopements are caused by the opposition of parents, but parental objection is still the most powerful single cause of runaway marriages.

And usually the parents are wrong, Dr. Popenoe found. In fact, it might be said that even when they are right they are wrong.

"Even in cases where parental opposition seems abundantly justified, the results sometimes seem to be satisfactory to those most closely concerned," he said.

He tells the story of a young girl living amid sordid surroundings in a small mining town, dominated by parents who were quarreling continually with each other. When a visiting baseball team came to play the local boys, she met some of the visitors. Within a few hours she eloped with the third-baseman.

"The parents might well have objected to the plan, particularly as the stranger was a Roman Catholic and the girl herself a Protestant," Dr. Popenoe comments. "But the experiment has been remarkably successful—the husband is a hard worker and the wife is a good home-maker. They are both wholly devoted to their home and their two children."

In another case, parental objection was even more inevitable. This girl ran away to marry her own uncle—the relatives

could hardly be expected to approve of that! But the married couple lived together very happily (although childless) until the wife's death a quarter of a century later.

Another girl was allowed no boy friends. When the mother rented a room in their house, she selected a man who was twice the girl's age, thinking this would be fairly safe. But one day the roomer and daughter eloped. They were making plans for a honeymoon when an auditor for the new husband's company arrived in town and found him a thousand dollars short in his accounts. The girl's grandfather made up the shortage, but the bridegroom was out of a job. Next day his car was "repossessed."

One-Way Trip

The bride's family called a council to decide how the family name could be protected from further revelations. As a result they made up a fund and bought two one-way railroad tickets to a city 1500 miles away.

In the distant city, the newlyweds proceeded to "live happily ever after!"

But parents are so seldom right. Dr. Popenoe admits regretfully that his study shows them up in a most unfavorable light as stubborn, possessive and selfish. In many cases where failure did result from an elopement, it was obvious that the parents caused the failure and that a little cooperation on their part would have made it a success.

Parents object to a girl's marriage because they want her earnings. Sometimes they merely want to keep the girl —or the boy—at home. Dr. Popenoe tells of two youngsters who were attending a university a thousand miles from home.

"In the man's senior year they married, saying nothing about it. Each continued to receive an allowance and they lived together very comfortably on this joint bank account, which would not have been sent to either one had the respective parents suspected the marriage.

"The couple now have two children of their own in college; their married life has been ideal even though its start was clouded by deceit, but neither set of parents has ever accepted the situation emotionally."

Some mothers want college educations or professional careers for their daughters. One even went to college with her daughter and roomed with her for three years. She then thought that her Julia was properly started toward spinsterhood and a musical career. But she had scarcely left town when Julia met a young man and within a week Julia was married. This marriage was a tragedy, for the bridegroom was as little prepared for married life as Julia was, educationally, economically, and emotionally.

AN INDUSTRY

In the quiet streets of Elkton, Maryland, signs show where hurried marriages can be arranged.

Those who wish for a quiet wedding may hope for a peaceful marriage, it seems from Dr. Popenoe's figures. The elopers who wanted to avoid publicity have a sixty-per-cent. record of happiness. This group includes many school teachers who feared dismissal if the fact of their marriage became known. Students have a similar motive in concealing their marriage until after graduation.

Poor But Proud

Here is another story in the record that is probably repeated many times over throughout the country during depression times. The husband was a man poor but proud. The wife had a job, but he had none. He didn't want folks to know that his wife had to work for a living. They were secretly married and the secret was kept for six years.

At the end of the six years, he was still proud and still poor but Mother Nature forced his hand. The wedding was announced and then the stork. The couple is very happy. It just goes to show that you never can tell.

Miss D. had had one church wedding. It was a huge affair and the talk of the town for weeks. But despite all the satin and lace, the rites and the sanctions, tragedy followed. Within a few months, it was discovered that the bridegroom was insane and the marriage was annulled. When, in a short time, she decided to wed again, the thought of another round of showers, and teas, another set of invitations, was overwhelming. She and her fiance just ran off and after nine years are still very happy.

Elopements Are Cheap

Elopements are cheaper. This is a good sound reason for running away, as is witnessed by the highest score for happy marriages. More than six out of each ten elopements embarked upon to save money turn out successfully, Dr. Popenoe's figures reveal.

One girl received a check for five hundred dollars from her aunt to cover the expenses of the wedding. The young couple were told that any amount saved out of this might be kept as a wedding gift. The couple who, it is suspected, are from Aberdeen, conferred:

Elopement, $5.

Balance on hand, $495.

But sometimes such schemes backfire. Dr. Popenoe tells of such a case.

"The family planned an elaborate and expensive ceremony. To avoid this, the young couple eloped. When they returned and found how much this wedding meant to the female relatives all around, they could not bring themselves to break the news, so they went ahead and had a second ceremony—the main

performance, under the big tent, so to speak."

Dr. Popenoe found in his records a number of stories in which the parents on both sides insisted on a big wedding but differed strongly as to how it should be held or who should be invited. Elopement was a wise solution.

There are shotgun elopements, too. These are few in number and not likely to be successful. Probably they were never intended to be—the idea was not to make a home together, but merely to go through a form that would protect the girl and the child that was coming. Divorce and marriage are planned simultaneously in such cases.

In several instances the situation was manufactured by the bride-to-be as a means of trapping her man or of taking him away from a rival. Occasionally, she makes a pretense which is really a form of blackmail.

One unhappy bridegroom, when he asked friends to congratulate him on his surprise marriage, received the information that his bride had tried the same trick on half a dozen others all of whom were sophisticated or callous enough to refuse the bait.

"Perhaps some of them turn out well," Dr. Popenoe says of the blackmail marriages. "But all of which I have any knowledge have been failures, though some of them lasted for a lifetime."

Last, and neither least nor most numerous, are the thrill elopements and the truly called gin marriages. Of them Dr. Popenoe says:

"One would not expect much from them, and the statistics show that they do not disappoint expectation. Several married on the impulse of the moment, merely to spite someone else. Fortunately, state laws requiring a few days notice before a license is issued, are being more and more widely adopted and will largely do away with this particular type of matrimonial escapade."

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Science News Letter, April 23, 1938

Modern chemists say Tyrian purple was inferior to modern dyes, yet 1,600 years ago wool dyed with Tyrian purple brought $350 a pound.

A colorimeter is used to take a permanent record of the exact color tone of each painting in the British National Gallery before and after cleaning.

GENERAL SCIENCE

Translation and Microfilm Unlock Science from Abroad

SEVENTEEN more translations of scientific value made under the direction of Prof. L. E. Hinkle of North Carolina State College have been deposited with American Documentation Institute (SNL, March 5, 1938).

To obtain any of the following translations in microfilm, order by document (Doc.) number and remit the price indicated to *Bibliofilm Service, Care Library of the U. S. Department of Agriculture, Washington, D. C.* For apparatus with which to read microfilm, inquire of Science Service, 2101 Constitution Ave., Washington, D. C.

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Science News Letter, April 23, 1938

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BIOLOGY

Young Folks Build Museum In North Carolina Town

UNIQUE among museums in the United States is one in Washington, N. C., which has been developed and is operated in regular, full-scale museum style by the young folks of the town, mostly those of high school age. The Washington Field Museum, as it is called, is a full-fledged member of the American Association of Museums, and its youthful curators are even now spending part of their spring vacation time in visits to its larger sister establishments conducted by grownups, to learn some new tricks of the craft for their own use.

It all started back in 1923, when a few high school students pooled their amateur collections of butterflies, snakes, etc., in a tent made of sacking. They named their embryo institution "The Bughouse Laboratory."

Instead of dying out presently, as such ventures are apt to do, the Bughouse Laboratory survived. It moved into a backyard kitchen, then into an empty store building. The Bughouse Laboratory became socially "the thing"; membership on its staff was more desirable than a bid to a fraternity.

Successive school generations graduated and grew up, and their younger brothers and sisters took their places. The "founding fathers", still young folks, began to have influence in the community. They secured a plot of land, which has been developed into a neat little park. A lumber company donated building materials, WPA labor was secured, and presently the Bughouse Laboratory moved into its new quarters, and added to its title the more formal style of Washington Field Museum.

There is a full-time director, Miss Mary Shelburne, but the rest of the curators are still boys and girls from school. They pursue all branches of research and collecting, with special emphasis on natural history and early Americana. A number of live animals have been donated, so the museum is now in the process of developing a zoo.

Science News Letter, April 23, 1938

Artificial rubies and sapphires are to be manufactured in Russia for jewelry, precision instruments, and watches.

Apple varieties change slowly, because the apple is a crop planted to last about half a century and a farmer is apt to be cautious about new varieties.

YOUTH'S HOUSE OF SCIENCE

The Washington, N. C., Field Museum (more familiarly and affectionately called the Bughouse Museum), started as a hobby of a few high school students, has grown to be a real civic center.

PSYCHOLOGY

World War, Downfall of Nazis Predicted in Princeton Poll

Experts in Social Science and Business Forecasting File Prognostications for Checking as Time Passes

A WORLD war in which the United States will be involved, a Democratic victory in 1940, passing of the Nazi form of government within 20 years. These are some of the prophecies made by the Mother Shiptons of our own present day as described to the Eastern Branch of the American Psychological Association by Dr. Hadley Cantril of Princeton University.

The soothsayer and oracle may have become outmoded, but civilized man has not lost interest in the future, Dr. Cantril said. Today, he turns to confidential business guides or public opinion polls for predictions of what lies ahead.

As a test of both professional and lay prophets, Dr. Cantril has sent a questionnaire asking for 70 different predictions to several hundred persons including experts such as outstanding bankers, newspaper and magazine editors, lawyers, life-insurance executives, public relations counsels, communists, historians, economists, sociologists and social psychologists.

Their predictions have now been tucked away to await the coming of events. One prophecy has already been tested by time, and that has fallen down. In April, 1937, when the survey was made, more than half (56 per cent.) the group thought the President's proposal for reorganization of the Supreme Court would pass Congress.

Historians, newspaper editors, and laymen agree in their predictions most closely with the total group judgments, Dr. Cantril found. Bankers and communists feel most sure of their hunches, even though their predictions are generally opposed.

Here are some of the events in store, if these predictions are fulfilled:

The industrial union, as contrasted with the craft union, will predominate in the United States within five years, predicted by nine-tenths.

There may be a strong national Farm-Labor party by 1944, predicted by 45 per cent.

Democrats will win in 1940, predicted by three-fourths.

All electric power in the United States will be publicly owned in about 20 years, predicted by 70 per cent.

The Government will take over all life insurance, 40 per cent.

The Government will own and operate radio broadcasting in 20 years, 50 per cent.

The United States will never become a collective state, 66 per cent.

The United States will never have a Fascist dictator, 90 per cent.

A European war is coming, 80 per cent. Nearly all say within 8 years. Germany will be the aggressor, say 60 per cent., Italy, 30 per cent., Japan, 7 per cent.

A combination of nations including England, France, and Russia, will win the war, 98 per cent.

The Spanish war will be won by the Loyalists, 50 per cent.

Another depression is on the way, 95 per cent. Most date it between 1941 and 1950.

Nazi government will last more than 20 years, say only 17 per cent.

U. S. S. R. will last more than 20 years, say 75 per cent. Soviet will endure indefinitely, 60 per cent.

People's wishes are involved in their predictions when the matters are of intimate personal interest, Dr. Cantril observed.

Science News Letter, April 23, 1938

GENERAL SCIENCE

World Organization for Science Being Planned

PLANS are being laid by the American and British Associations for the Advancement of Science for the organization of international cooperation among scientists on a wider scale than exists at present.

The secretaries of the two national organizations are exchanging notes on methods of cooperation and a conference, either of British and American representatives alone, or a larger meeting of scientific leaders from all countries interested, is tentatively scheduled for this summer.

Arising from the increasing realization in both nations that scientists are responsible in large measure for the effects of science on society, the present moves for formal cooperation originate from a resolution passed by the council of the American Association for the Advancement of Science at its meeting last December. The stage for this action had been set by the emphasis upon "science and society" provided by the 1936 and 1937 meetings of the British Association.

The British viewpoint is that the proposed world organization essentially would be composed of national and scientific groups that uphold the democratic ideals and mechanisms of scientific freedom. The British scientific journal, "Nature," of which Sir Richard Gregory, Bart., is editor, has led in emphasizing the need of resisting the encroachments that totalitarian governments have made upon scientific methods and liberties of thought.

The invitation to cooperation should not be dependent on racial, political or theological qualifications, Dr. F. R. Moulton, permanent secretary of the American Association, has urged. He contemplates the "formulation of a set of fundamental scientific principles of an ethical nature on which unanimous agreement of the delegates can be reached" and "the formulation of the maximum number of inviolable methods of international intercourse and cooperation among scientists on which the delegates can unanimously agree."

If such a common ground were established, Dr. Moulton suggests that it can be gradually enlarged until it will form a substantial basis for the general progress of civilization.

Science News Letter, April 23, 1938

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bed in a California desert, and a mine in New Mexico where men worked beneath an overlying blanket of water, have made America's potash industry possible, was described at a special symposium of the American Chemical Society.

Prior to the World War, Germany with its great potash deposits at Strassfurt, monopolized the world's potash trade. These Strassfurt deposits, formed in prehistoric times by the evaporation of sea water which then covered the spot, have an origin comparable with the dry, desert-bounded Searles Lake at Trona, California.

By drilling wells into the dry lake a strong brine is encountered which contains over 35 per cent. dissolved chemicals, said W. A. Gale, chemist of the American Potash and Chemical Corporation at Trona.

The brine is rich in the salts of potassium and sodium and the separation of the various fractions by evaporation is one of the triumphs of American chemistry. The prior work in Germany was of little use in developing the present processes. The physical difficulty of founding a town of 1,800 workers in a desert region was no small feat in itself.

The Searles Lake deposits at Trona furnished 40 per cent. of America's potash needs last year, said R. W. Mumford of the same company, another speaker on the program.

As auxiliary products the salt brine produces 40 per cent. of the world's consumption of borax and boric acid, together with substantial amounts of soda ash and salt cake.

In the California brine wells the potassium chloride is obtained only after

ingenious evaporation processes. In the New Mexico deposits, near Carlsbad, the potassium chloride is mined in operations which, in some ways, are a race against time. The urgency arises because the potassium chloride deposits lie beneath layers of water-bearing sand and gravel. If that water enters the potash mine, the operations will be abandoned because the potassium chloride is highly soluble in water.

"Should water enter the mine through caving," said R. M. Magraw of the Potash Company of America," the damage will be to a property that would be exhausted in any event if no effort were made towards ultimate recovery."

The Carlsbad mine is worked at the 1,000-foot level, consisting of salt and other solutions immediately above the bed. The top 400 feet consist of porous water-bearing limestones, shales and clays.

In sinking the mine shaft water was often encountered. In one case the flow was 1,000 gallons a minute, said Mr. Magraw. Ingeniously these leaks were stopped and the shaft lined with concrete to stay, permanently, the flow. Water pressures of 84 pounds to the square inch now exist behind the concrete walls.

Below all this water miners do their work, using mechanical techniques as much as possible. Large amounts of explosives are employed because of the toughness of the ore. Room and pillar mining is employed with the pillars still in place. Eventually the pillars may be "pulled," said Mr. Magraw, when the deposits have been completely exploited. But, until that time, they will remain untouched because of the danger of bringing down the overlying water-bearing deposits and hence ruining the valuable potash.

Science News Letter, April 23, 1938

The German government has banned the use of the inflammable gas hydrogen in Zeppelins, even for trial flights.

●RADIO

April 28, 3:00 p. m., E.S.T.

MENTAL LONGEVITY—Dr. Walter R. Miles, psychologist, Yale University.

May 5, 3:00 p. m., E.S.T.

TAMING THE WILD FLOWERS—Dr. P. L. Ricker of the U. S. Department of Agriculture.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

SOIL CONSERVATION

NATURE RAMBLINGS by Frank Thone

The Return of Malthus

MALTHUS' ghost has returned to haunt us, in a new guise.

During the nineteenth century, the principles of Malthus, first set forth in his famous essay on population in 1798, were among the dominant ideas in political and social thinking. Briefly, Malthus took the gloomy view that human population always tended to increase faster than its food supply, and that misery and want and war were the inevitable consequences.

Malthus left out of consideration (for the good reason that he did not know anything about them) a number of factors that have operated at least in part to prevent realization of his pessimistic prophecy. Improvement of crop plants and food animals, invention of more efficient cultivation methods, and better means of keeping and marketing food have done much to increase the food supply. Later marriage, wider use of contraception, and possibly other factors have slowed down population increase.

But just as we are congratulating ourselves on the laying of the Malthusian ghost, up it pops again, out of the gullies of eroded and abandoned farm lands. Prof. Paul Sears, author of "Deserts on the March", expresses it as a general principle: "In the development of any civilization, the total area of cultivable land tends constantly to diminish."

Prof. Sears has pointed out the working of this principle in all the world's dead and dying cultures: Syria and Chaldea, Rome and China—and our own. Not only for necessary bread but for swollen profits, men strip the forest, pasture goats on the hills, tear the banquet-cloth from earth's table with over-eager plows. Ruin has always followed. Ruin threatens now.

Yet there is time. Just as we eased the pressure of the older Malthusianism with better crops better cultivated, so now we can restore forests and grasslands, stop gullies, plow more sensibly. It will cost money, require more effort. But the alternative choice is decline and ultimate death.

Science News Letter, April 23, 1938

GEOGRAPHY—PHOTOGRAPHY

Death Valley Sands Make Rare Camera Subject

See Front Cover

SAND dunes in the sunset, three hundred feet below sea level, drifting in the wind over the floor of this weirdly-beautiful Death Valley, have been caught by the camera of George A. Grant, Interior Department photographer. The photograph on the cover of this week's SCIENCE NEWS LETTER is one of a series which Mr. Grant has taken of Death Valley for the National Park Service. Others have been shown as works of art in a number of exhibitions, including the annual show of the Explorers Club.

Science News Letter, April 23, 1938

PALEONTOLOGY

Fossil Jaw of Whale Found Near Washington

THE FOSSIL jaw of a whalebone whale has been found near Washington, D. C., by geologists of the Catholic University of America. Somewhat broken when found, the pieces have been put together by Dr. Arthur R. Barwick, and the restored jawbone, now practically complete, is now in the University Museum.

The fossil has a total length of 118 centimeters, or a little more than four feet. As in modern whalebone whales, it has no teeth. No part of the whalebone plates once associated with it have survived: it is simply a heavy, slightly curved rod of bone.

In age it belongs to the middle period of the Age of Mammals, known as the Miocene, its antiquity estimated as about 34 million years.

Science News Letter, April 23, 1938

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Radio

FUNDAMENTALS OF RADIO—Frederick E. Terman and F. W. MacDonald—*McGraw-Hill,* 458 p., $3.75. Stanford University's professor of electrical engineering presents a new edition of his comprehensive book covering all phases of radio communication. The volume is written from the viewpoint of the engineer who is interested not only in the qualitative phases of radio phenomena, but also in making quantitative analyses for research purposes.

Science News Letter, April 23, 1938

Medicine

THE BIOLOGICAL STANDARDIZATION OF THE VITAMINS—Katharine H. Coward—*William Wood,* 227 p., $4.50. A technical book which should prove useful to scientists working in the vitamin field. The author is reader in biochemistry at the University of London and head of the nutrition department of the Pharmaceutical Society of Great Britain.

Science News Letter, April 23, 1938

Archaeology

THE BIBLICAL ARCHAEOLOGIST—*American Schools of Oriental Research,* quarterly, 50 c. per year. See page 268.

Science News Letter, April 23, 1938

Physiology

THE ART AND SCIENCE OF MARRIAGE—Esther B. Tietz and Charles K. Weichert—*Whittlesey House,* 279 p., $2.50. Besides the specific information and advice on marriage itself, this book describes simply and fully the physiology of reproduction. Dr. Morris Fishbein, editor of The Journal of the American Medical Association, has written a foreword.

Science News Letter, April 23, 1938

Herpetology

THE WAY OF A SERPENT—T. H. Gillespie—*McBride,* 221 p., illus., $2.50. A popular account of the habits of snakes. It tells about them as they live in nature, and also gives suggestions to such as desire to cultivate their closer acquaintance as pets—they make excellent pets. The photographic illustrations are very good.

Science News Letter, April 23, 1938

Physics

COLLEGE PHYSICS—Henry A. Perkins—*Prentice-Hall,* 820 p., $3.75. The professor of physics at Trinity College gives his version of introductory work in physics. He states in his preface: "The purpose of this book is to give the students a substantial grasp of physical principles rather than to describe phenomena. The more difficult portions are therefore treated more fully than is usual in elementary texts. Difficulties are met without evasion and without sacrificing clearness in an attempt to be brief."

Science News Letter, April 23, 1938

Aeronautics

AMERICAN WINGS: MODERN AVIATION FOR EVERYONE—Burr Leyson—*Dutton,* 215 p., illus., $2. A popular manual of aviation, with a heavy emphasis on military aeronautics. Well illustrated with official Army and Navy photographs. Omitting details on the technical side of flying, it still manages to cover those portions of the field coming to public view.

Science News Letter, April 23, 1938

Philology

DES JOSEF BEN GORION (JOSIPPON) GESCHICHTE DER JUDEN, NACH DEN HANDSCHRIFTEN IN BERLIN, LONDON, OXFORD, PARIS UND STRASSBURG—Murad Kamil, ed.—*Augustin,* 333 p., 12 plates, $15. This Ethiopic version of the Pseudo-Josippon's history of the Jews, from early times to the reign of Titus, is of interest to students of Ethiopia's language and Jewish tradition in Ethiopia. Explanations of the Ethiopic text are given in German.

Science News Letter, April 23, 1938

Traffic Safety

SAFETY FIRST—AND LAST—Charles F. Dull—*Holt,* 262 p., illus., $1.75. This clear and very interesting book is designed as a text for the safety classes in high schools. It is well organized and questions are given at the end of each chapter which not only serve as a review but also promote thought. A considerable part of the book is devoted to a discussion of the safety problem in connection with automobiles but the other phases of accidents are described.

Science News Letter, April 23, 1938

Geography

WINGS OVER ASIA, A GEOGRAPHIC JOURNEY BY AIRPLANE—Lowell Thomas and Rex Barton—*Winston,* 399 p., $1.20. In true modern style, via airplane, these two traveler guides carry young readers into the lands of the east. A supplementary geography text for high school age, the book presents the countries from as many angles as possible—economic, physical, quaint and colorful, social.

Science News Letter, April 23, 1938

Physiology

THE DEUCE OF REDUCING—Katherine Mitchell—*Covici-Friede,* 112 p., $1.50. This is a delightfully jolly, highly readable book on reducing written by an authority. Sample menus, including directions for what to eat at a dinner party without gaining pounds and pounds, and tables of food values are included.

Science News Letter, April 23, 1938

History

BEGINNINGS OF TOWN-LIFE IN BRITAIN—R. E. M. Wheeler—*British Association for the Advancement of Science, London, Eng.,* 8 p., 6 d. See page 269.

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Marine Engineering

EVERY BOY'S BOOK OF GREAT LINERS—J. D. Burgan White—*Appleton,* 96 p., illus., $1.50. The story in picture and word of today's ocean liners. Tells, too, of the make-up of an Atlantic greyhound's crew, navigation, shipbuilding and the internal workings of a great vessel.

Science News Letter, April 23, 1938

Geography

BEYOND HORIZONS—Lincoln Ellsworth—*Doubleday Doran,* 403 p., $3.50. The making of a great explorer, told in a wealth of fascinating detail, from his boyhood days when he acquired his ideal of physical endurance, to the exciting fulfillment of his dreams in the Arctic and Antarctic. A long story, never dull.

Science News Letter, April 23, 1938

Astronomy

ASTRONOMY—W. M. Smart—*Oxford,* 158 p., $1.50. The professor of astronomy at the University of Glasgow writes about planets and the stars for the layman. Two-thirds of the book is devoted to a discussion of the various planets.

Science News Letter, April 23, 1938

Economics

THE INCOME STRUCTURE OF THE UNITED STATES—Maurice Leven—*Brookings Institution,* 177 p., $1.50. This is the story of the American pocketbook, not just the cash, but the accrual aspects of our income. It considers particularly the situation since 1929.

Science News Letter, April 23, 1938

Biography

THE AMERICAN CATHOLIC WHO'S WHO, 1938 and 1939—*Walter Romig and Company,* 491 p., $6.50. A due proportion of scientists are listed among the clergy, religious, and laity whose names and biographies fill this book.

Science News Letter, April 23, 1938